Idaho State Department of Agriculture
Division of Agricultural Resources

Jump Creek
Water Quality Monitoring Report
April 2009 through September 2009
Prepared for
Owyhee Conservation District

by
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ISDA Technical Report Summary W-33

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Introduction

The Idaho State Department of Agriculture (ISDA) working in conjunction with the Owyhee Conservation District (OCD) and the Idaho Soil Conservation Commission (ISCC), conducted a water quality monitoring program on Jump Creek. Jump Creek is a 25.6 mile long stream that drains a 170 square mile watershed. Jump Creek resides within Hydrological Unit Code (HUC) 17050103 and is located in Owyhee County between the cities of Marsing and Homedale, Idaho. As Jump Creek enters the lower Snake River Plain it becomes impacted by small tributaries and agricultural return drains.

Jump Creek was listed on the State of Idaho's 303(d) list and the Idaho State Department of Environmental Quality (IDEQ) completed a total maximum daily load (TMDL) for sediment in 2003 (IDEQ, 2004). The Jump Creek assessment was included in the Mid-Snake River/Succor Creek Subbasin Assessment and TMDL which was approved by the Environmental Protection Agency in 2004.

ISDA historically monitored Jump Creek in 2001 and 2002 to collect background data for the pending TMDL process. Additional drains and tributaries to Jump Creek were monitored in 2001 and 2002 to evaluate pollutant loadings from various sources. The 2009 monitoring was conducted to compare pre-TMDL data to current conditions after an approximate seven year period. Only the lower site on Jump Creek (JC-1) was monitored in 2009 for comparison to the same site monitored during the 2001 and 2002 period (Figure 1.)

The 2009 monitoring took place weekly from April to June and then biweekly through September (N=18). The 2001 and 2002 data was collected biweekly from April through October and then monthly through the winter months. Only data collected from April through September during the 2001 and 2002 monitoring (N=13) were used for data comparisons in this report.

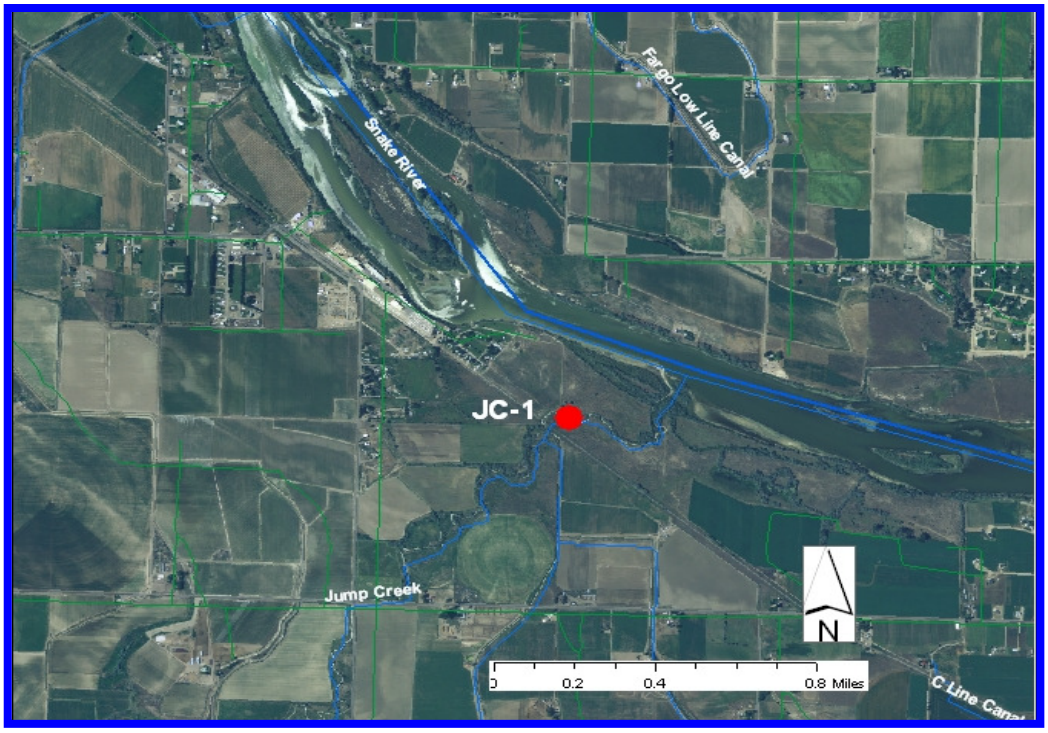

Figure 1. Lower Jump Creek (JC-1) monitoring site.

The TMDL for Jump Creek established sediment as the pollutant of concern and set sediment limits within the water column of 65 mg/L during the irrigation season. Phosphorus concentrations within Jump Creek, during the irrigation season, need to meet the Snake River Hells Canyon TMDL concentration of ≤ 0.07 mg/L.

General Results

Discharge (CFS)

Average discharge levels between the three years did not vary significantly. Table 1 compares the average discharge in cubic feet per second (CFS) for all three monitoring years.

Table 1. Yearly average irrigation season discharge.

Year 2001	Year 2002	Year 2009
89 CFS	103 CFS	108 CFS

The variations in the monthly average discharge for the three monitoring years are shown in Figure 2.

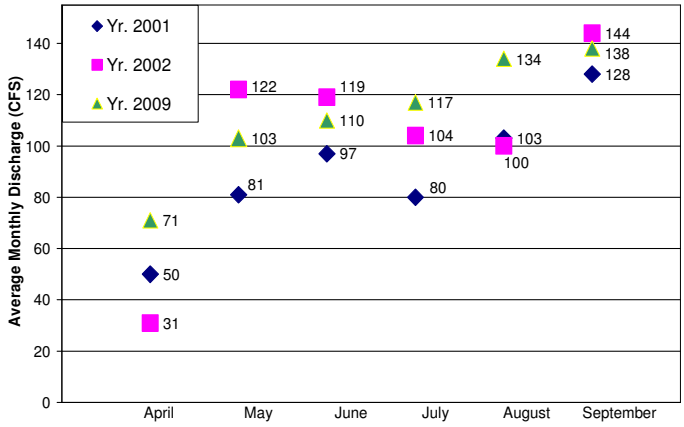

Figure 2. Comparison of average monthly discharge.

Suspended Sediment Concentration

Two varying analytical techniques were used to evaluate sediment concentrations in Jump Creek. The data collected by ISDA in 2000 and 2001 for determining sediment loads was based on total suspended solids (TSS) analysis. The sediment data results in 2009 were based on suspended sediment concentration (SSC) analysis. IDEQ determined during the development of the Jump Creek TMDL that the two varying techniques correlated well when evaluating sediment loading. Therefore, the data collected in 2000, 2001, and 2009 can be compared directly. To evaluate the data the term suspended sediment concentration (SSC) will be used when comparing data.

The Jump Creek TMDL set a limit of 65 mg/L of suspended sediment, during the irrigation season (critical period), to meet its beneficial uses.

The average concentration of sediment from April through September has remained relatively constant from the 2000, 2001 data when compared to the 2009 data (Table 2).

Table 2. Average SSC concentration irrigation season.

Year 2000	Year 2001	Year 2009
189 mg/L	180 mg/L	187 mg/L

The average monthly sediment concentrations for all three years are shown in Figure 3.

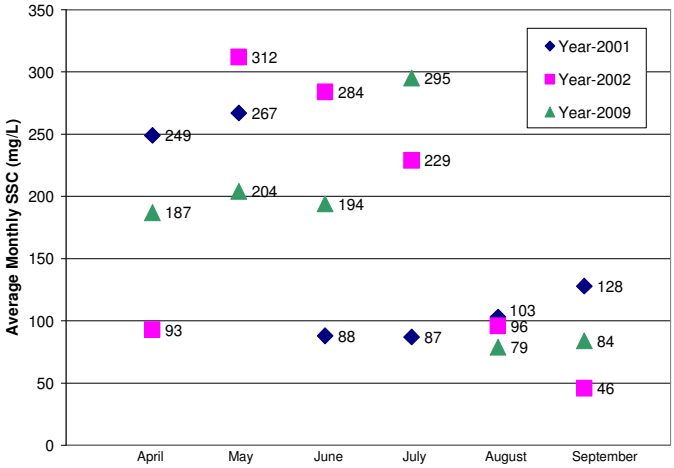

Figure 3. Yearly comparison of average monthly SSC.

Using the TMDL goal for SSC you can compare the load reduction required to meet the sediment concentration of 65 mg/L (Figure 4).

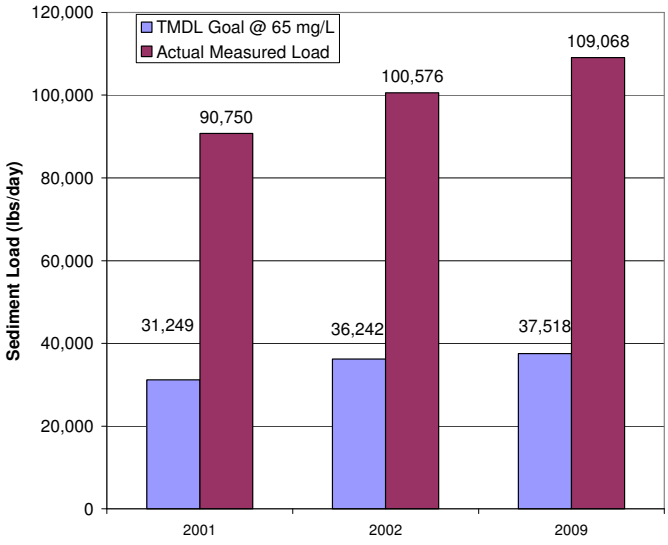

Figure 4. TMDL load compared to measured load (lbs/day). Load = concentration (mg/L) x discharge (CFS) x K (5.39).

The actual SSC load reductions that will be needed to achieve the TMDL goal, for all three years, remained relatively constant (2001 66%, 2002 64%, and 2009 66%).

Total Phosphorus (TP)

The Jump Creek TMDL does not directly address total phosphorus (TP) reductions but requires reductions based on the Mid Snake River/Succor Creek TMDL phosphorus allocation. The Snake River Hells Canyon (SRHC) TMDL set a phosphorus limit of ≤0.07 mg/L. Since the Mid Snake River/Succor Creek segment is directly upstream of the SRHC segment, the phosphorus limit would also apply to the Mid Snake/Succor Creek reach. This TP reduction requirement would also be allocated to any tributary that confluences with the Mid Snake/Succor Creek reach, which includes Jump Creek.

Table 3 lists the average TP concentrations for the three monitoring years during the critical period (April-September). The 2009 average shows an increase in TP of approximately 24% over the previous years.

Table 3. Yearly TP average.

Year 2001	Year 2002	Year 2009
0.32 mg/L	0.33 mg/L	0.42 mg/L

The variation in the average monthly concentrations, for the three monitoring years, are presented in Figure 5.

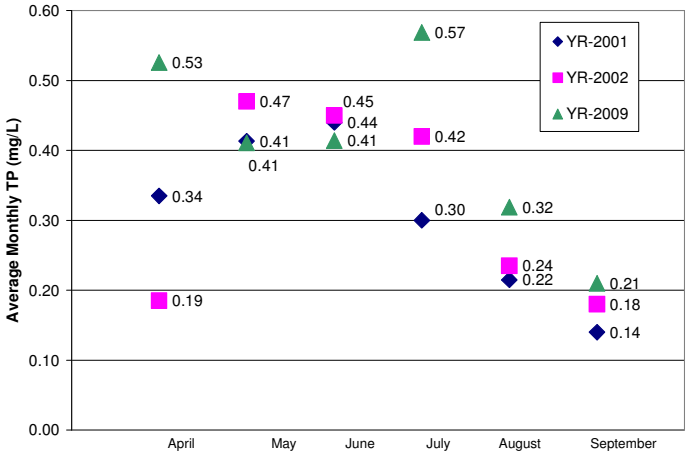

Figure 5. Comparison of average monthly TP concentrations.

The overall increase in average TP concentration for the 2009 monitoring was primarily due to the high concentrations recorded in April and July. April had TP concentrations of 0.49, 0.56, and 0.53 mg/L and July had concentrations of 0.62, 0.58, and 0.51 mg/L.

Calculating the load (lbs/day) and comparing the TMDL concentration (≤0.07 mg/L) load with the actual measured concentration load allows for calculating the necessary load reductions needed to meet the TMDL. Figure 6 indicates that load reductions for data collected in 2001 and 2002 were 78% and 79% respectively. The increased TP concentration for the 2009 data would require a reduction of 84% to meet the TMDL goal of ≤0.07 mg/L.

Conclusions

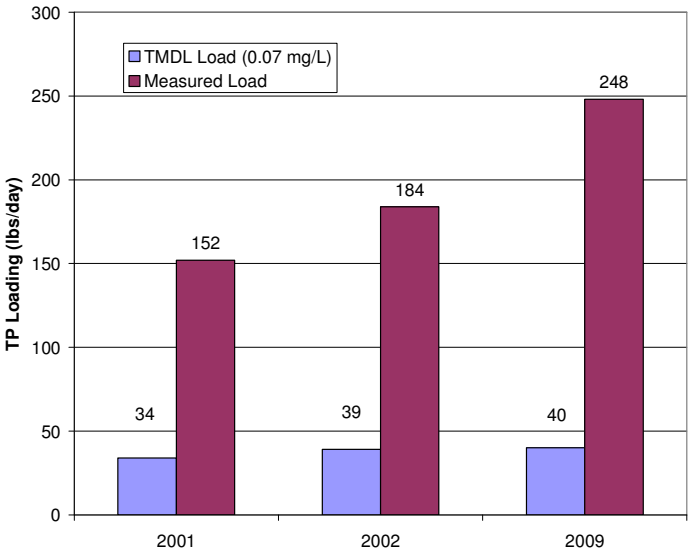

Figure 6. TMDL TP load compared to TP measured load. Load = concentration (mg/L) x discharge (CFS) x K (5.39)

Comparing water quality data collected in 2001 and 2002 with data collected in 2009 indicate that very little change has occurred within the watershed to reduce the loading of SSC and TP into Jump Creek. The major change in the data was the 24% increase in average TP concentration in 2009.

Given the large reductions required to meet the TMDL goals (approximately 65% reduction in sediment and an approximate 80% reduction in phosphorus) the challenge would appear to be unattainable at these current concentrations. The large amount of money and technical support that would be needed for these reductions would require a very long term commitment from agencies and landowners. No reduction in SSC and TP over an approximate seven year period indicates the need for watershed wide best management practices (BMPs) at all tier levels within the watershed.

References

Idaho Department of Environmental Quality. 2004. Mid Snake River/Succor Creek Subbasin Assessment and TMDL.